

Dietary supplementation of DigestaWell NRG to unconditioned Warmblood mares may reduce lactate rise following exercise

Ashley L. Wagner¹, Rebecca K. Splan², Jessica K. Suagee-Bedore³, and Ivan D. Girard¹

¹Probiotech International, St-Hyacinthe, Quebec, Canada; ² Virginia Polytechnic Institute and State University, Blacksburg, VA; ³Ohio State University Agricultural Technological Institute, Wooster, OH



ABSTRACT

Lactate rise during strenuous exercise and prolonged recovery to pre-exercise levels may partially contribute to elevated muscle soreness in humans and horses. Many equine disciplines require consecutive days of competition, and thus, horses may be challenged with soreness during successive days of work or competition. Additionally, during training muscle soreness may affect or impair progress while trying to increase fitness in horses. There are a number of commercially available dietary supplements containing spices that are marketed to improve performance or exercise recovery; however, research on their efficacy is limited. Therefore, the objective of this research was a preliminary evaluation of a novel proprietary blend of spices in the supplement, DigestaWell NRG (NRG) on lactate rise and post-exercise lactate recovery in unconditioned horses. Nine mature warmblood mares were used in a cross-over design with a 7d washout period. Mares were fed twice daily with 1 kg concentrate supplemented with or without 100g of NRG for 7d. On day 7 horses performed a standardized exercise test which venipuncture blood samples were collected pre-, 10 and 30 min post-exercise test. Plasma lactate was determined using a YSI 2300 STAT Plus glucose and lactate analyzer, and changes in lactate concentration were determined using repeated measures analysis of variance in the PROC MIXED procedure of SAS 9.3. The rise in lactate concentration (change from pre-exercise to 10 min post-exercise) as a result of exercise tended to be lower ($P = 0.10$) in NRG ($52 \pm 15\%$) compared to control horses ($101 \pm 15\%$). Additionally, the return post-exercise determined by the change in lactate concentration from 10 to 30 min post-exercise tended to be higher ($P = 0.10$) in NRG ($28 \pm 3\%$) compared to control horses ($20 \pm 3\%$). The results of this preliminary trial show promise of NRG to reduce lactate rise and improve lactate recovery in unconditioned horses in response to exercise after consuming NRG after 7d. This may indicate the potential for NRG to reduce muscle soreness following exercise; however, additional research is warranted with a longer supplementation period to determine the effects of NRG on lactate, inflammation, and muscle soreness following exercise.

OBJECTIVE

The objective of the present trial was to perform a preliminary evaluation of the efficacy of a novel proprietary blend of spices in the product DigestaWell[®] NRG, which could be used as either a supplement or feed additive, on the rise and recovery of lactate following a standardized exercise in unconditioned Warmblood mares.

HYPOTHESIS

CONTROL:

LACTATE



DIGESTAWELL[®] NRG:

LACTATE

MATERIALS AND METHODS

- Nine mature (average age: 15.3 ± 1.9 years) unconditioned Warmblood mares were selected for this preliminary trial
- Cross-over design
- Housed on pasture and offered a commercially available ration balancer at 1 kg per day
- DigestaWell[®] NRG was top-dressed onto ration balancer at 200g per day for 7 days
- On day 7 horses performed a standardized exercise test and venipuncture blood samples were collected pre-, 10 and 30 min post-exercise test
- Standard Exercise Test performed in an exerciser:
 - 5 min Walk
 - 2 min Trot
 - Change Direction
 - 1 min Walk
 - 0.5 min Trot
 - Canter until unable to keep pace with exerciser, despite auditory encouragement
- Washout period of 7 days
- Plasma lactate was determined using a YSI 2300 STAT Plus glucose and lactate analyzer
- Changes in lactate concentration were calculated
 - Rise in lactate concentration: change from pre-exercise to 10 min post-exercise
 - Lactate recovery: change in lactate concentration from 10 min post-exercise to 30 min post-exercise
- Changes in lactate concentration were determined using repeated measures analysis of variance in the PROC MIXED procedure of SAS 9.3

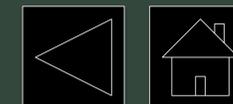
RESULTS

- The rise in lactate concentration as a result of exercise tended to be lower ($P = 0.10$) in DigestaWell[®] NRG ($52 \pm 15\%$) compared to control horses ($101 \pm 15\%$).
- Lactate recovery tended to be higher ($P = 0.10$) in DigestaWell NRG ($28 \pm 3\%$) compared to control horses ($20 \pm 3\%$).

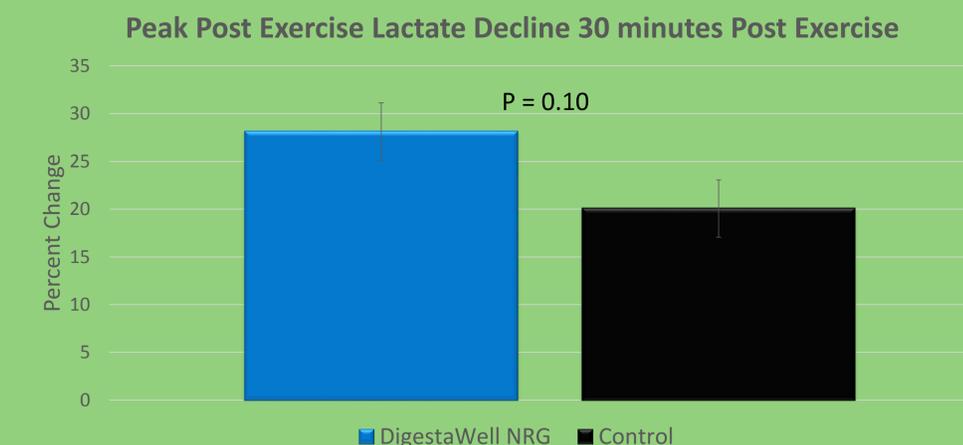
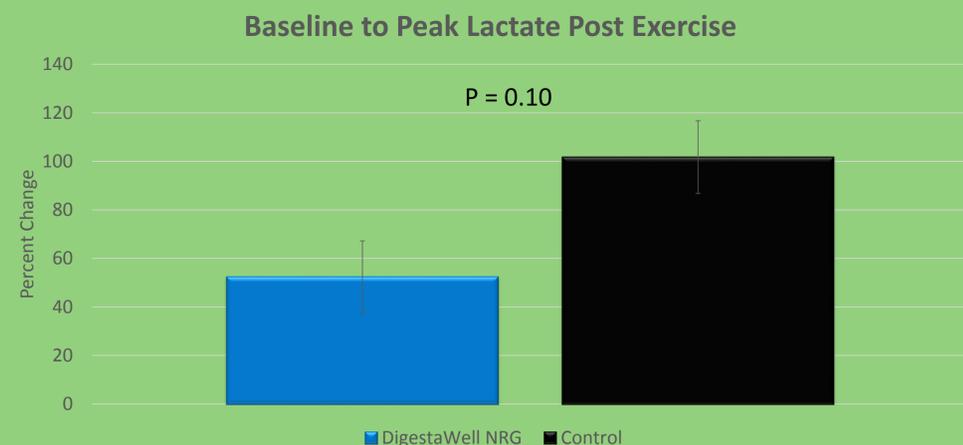
Dietary supplementation of DigestaWell NRG to unconditioned Warmblood mares may reduce lactate rise following exercise

Ashley L. Wagner¹, Rebecca K. Splan², Jessica K. Suagee-Bedore³, and Ivan D. Girard¹

¹Probiotech International, St-Hyacinthe, Quebec, Canada; ² Virginia Polytechnic Institute and State University, Blacksburg, VA; ³Ohio State University Agricultural Technological Institute, Wooster, OH



RESULTS



DISCUSSION

As a preliminary investigation, this trial demonstrated the efficacy of DigestaWell[®] NRG to reduce the rise in lactate due to exercise and improve lactate recovery following exercise. In humans, elite athletes have a lower rise in lactate following exercise than amateurs (Sung et al., 2015), and have a faster lactate recovery (Sung et al., 2015). Because blood lactate patterns in horses in response to exercise mimic those of humans (Lehnhard et al., 2010; Campbell, 2011), we can also say that the rise in lactate and recovery of lactate due to exercise indicates fitness level in horses. In unconditioned horses, the use of DigestaWell NRG demonstrated a metabolic improvement in fitness level after a 7 day supplementation. Although the results were only a tendency in this preliminary trial, it is likely that with a longer supplementation period (greater than 7 days) a stronger effect could be present; further research is warranted to demonstrate this. Additionally, post-exercise lactate rise and recovery have been demonstrated to be in agreement with measurements of muscle soreness and tightness following exercise (Powell et al., 2008), and thus, there may be potential for DigestaWell NRG to reduce post-exercise muscle soreness and tightness following exercise. This is increasingly important in horses showing weekly as research has demonstrated that a 5 day period between events is not sufficient for muscle metabolites to recover (Assenza et al., 2016), and horses in training. Further research is required to determine the effects of DigestaWell NRG on post-exercise inflammation and muscle soreness.

CONCLUSION

The results of this preliminary trial show promise of DigestaWell[®] NRG to reduce lactate rise and improve lactate recovery in unconditioned horses in response to exercise after consuming DigestaWell NRG after 7d. This may indicate the potential for DigestaWell NRG to reduce muscle soreness following exercise; however, additional research is warranted with a longer supplementation period to determine the effects of DigestaWell NRG on lactate, inflammation, and muscle soreness following exercise.

REFERENCES

1. Assenza, A., S. Marafioti, F. Congiu, C. Giannetto, F. Fazio, D. Bruschetta, and G. Piccone. 2016. Serum muscle-derived enzymes response during show jumping competition in horse. *Vet. World.* 9: 251-255.
2. Campbell, E.H. 2011. Lactate-driving equine conditioning programmes. *Vet J.* 190:199-207
3. Lehnhard, R.A., M. Bartlett, B.M. Roche, K.W. Hinchcliff, and K.H. McKeever. 2010. Variations in lactate during a graded exercise test due to sampling location and method. *Comparative Exercise Physiol.* 7: 81-87.
4. Powell, D.M., K. Bennett-Wimbush, A. Peeples, and M. Duthie. 2008. Evaluation of indicators of weight-carrying ability of light horses. *JEVs.* 28: 28-33.
5. Sung, B.J., S.Y. Jeon, S.R. Lim, K.E. Lee, and H. Jee. 2015. Equestrian expertise affecting physical fitness, body compositions, lactate, heart rate and calorie consumption of elite horde riding players. *J. Exer. Rehab.* 11:175-181.